

We claim:

1. A method for equalizing and decoding data signals, which comprises the steps of:

receiving a radio signal containing an error-protection-coded data signal transmitted over a radio channel, the data signal being error-protection coded at a transmitter end;

sampling the radio signal received to generate a digital input data signal;

feeding the digital input data signal to an adaptive equalizer having a first channel estimator which repeatedly determines first channel parameters of the radio channel, the adaptive equalizer uses the first channel parameters to calculate and output an equalized data signal;

feeding the equalized data signal to a second channel estimator which repeatedly calculates second channel parameters including a variance of radio channel noise and a damping factor of the radio channel using a method of moments;

feeding the second channel parameters to a decoder to be used as computing parameters in the decoding for calculating a decoded output signal; and

decoding the equalized data signal in the decoder to determine the decoded output signal which is a reconstruction of an initial input signal on which the error-protection-coded data signal is based.

2. The method according to claim 1, which comprises basing a coding and the decoding on a turbo code.

3. A method for equalizing and decoding a data signal transmitted via a radio channel and the data signal is error-protection-coded with an aid of a turbo code at a transmitter end, which comprises the steps of:

receiving a radio signal carrying the data signal;

sampling the radio signal received to generate a digital input data signal;

feeding the digital input data signal to an adaptive equalizer having a first channel estimator which repeatedly determines first channel parameters of the radio channel, the equalizer uses the first channel parameters to calculate and output an equalized data signal;

feeding the equalized data signal to a second channel estimator which repeatedly determines second channel parameters of the radio channel;

feeding the second channel parameters to a turbo decoder to be used as computing parameters in the turbo decoder for calculating a decoded output signal;

decoding the equalized data signal in the turbo decoder to determine the decoded output signal which is a reconstruction of an initial input signal on which the data signal error-protection-coded at the transmitter end is based.

4. The method according to claim 3, wherein the second channel parameters include a variance of radio channel noise, and a damping factor of the radio channel.

5. The method according to claim 4, which comprises calculating the second channel parameters using a method of moments.

6. The method according to claim 1, which comprises carrying out one of linear zero-forcing block equalization and linear minimum-mean-square-error block equalization on the digital input signal.

7. A device for equalizing and decoding an error-protection-coded data signal transmitted over a radio channel, the device comprising:

an adaptive equalizer having a first channel estimator, said adaptive equalizer receiving a digital input data signal generated by sampling a received radio signal carrying the error-protection coded data signal, said first channel estimator repeatedly determining first channel parameters of the radio channel, said adaptive equalizer calculating and outputting an equalized data signal with an aid of the first channel parameters;

a second channel estimator connected to said adaptive equalizer and receiving the equalized data signal, said second channel estimator repeatedly determining second channel parameters including a variance of radio channel noise and a damping factor of the radio channel using an algorithm based on a method of moments; and

a decoder connected to said second channel estimator and receiving the second channel parameters to calculate a decoded output signal, said decoder also receiving the equalized data signal for determining the decoded output signal which is a reconstruction of an initial input signal on which the error-protection-coded data signal is based.

8. The device according to claim 7, wherein said decoder is a turbo decoder.

9. A device for equalizing and decoding a data signal transmitted via a radio channel and the data signal is error-protection-coded with an aid of a turbo code, the device comprising:

an adaptive equalizer having a first channel estimator, said adaptive equalizer receiving a digital input data signal generated by sampling a received radio signal carrying the data signal error-protection-coded at a transmitter end, said first channel estimator repeatedly determining first channel parameters of the radio channel, and said adaptive equalizer calculating and outputting an equalized data signal with an aid of the first channel parameters;

a second channel estimator connected to said adaptive equalizer and receiving the equalized data signal, said second channel estimator repeatedly determining second channel parameters of the radio channel; and

a turbo decoder connected to said second channel estimator and receiving the second channel parameters for calculating a decoded output signal, said turbo decoder also receiving the

equalized data signal for determining the decoded output signal which is a reconstruction of an initial input signal on which the error-protection-coded data signal error-protection-coded at the transmitter end is based.

10. The device according to claim 9, wherein said second channel estimator estimates a variance of radio channel noise, and a damping factor of the radio channel.

11. The device according to claim 10, wherein said second channel estimator operates using an algorithm based on a method of moments.

12. The device according to claim 7, wherein said adaptive equalizer is selected from the group consisting of linear zero-forcing block equalizers and linear minimum-mean-square-error block equalizers.